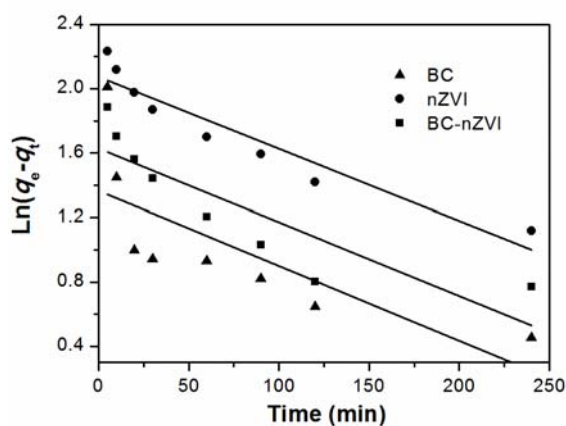
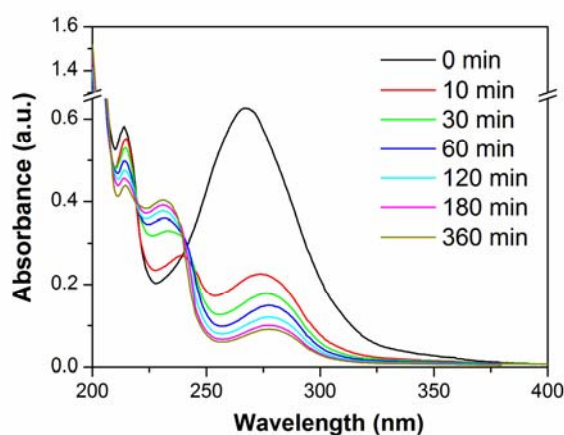


## Supporting materials

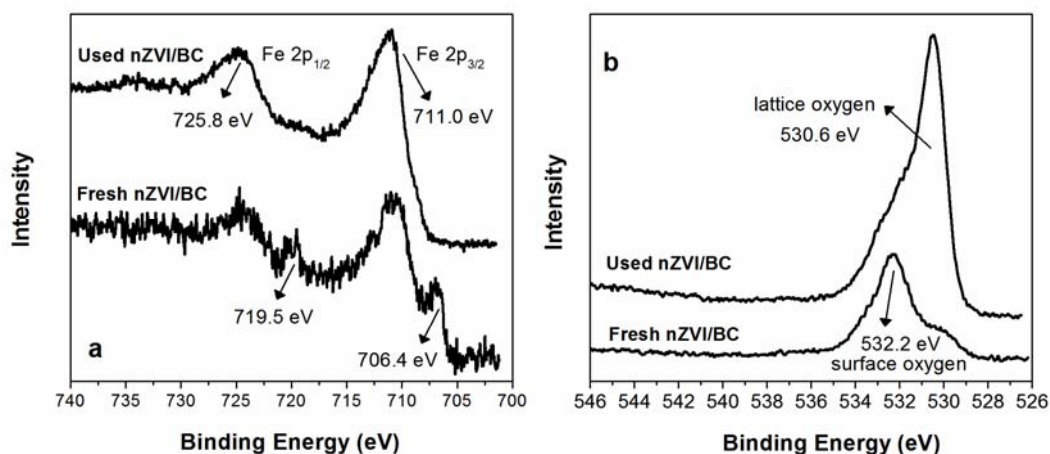


**Fig. S1** The fitting of NB removal processes by pseudo-first-order kinetic model. Reaction condition: nZVI dosage: 0.15 g/L, nZVI/BC dosage: 0.30 g/L, initial pH: 8.0



**Fig. S2** UV-Visible spectral changes during the removal of NB by nZVI/BC at room temperature. Reaction condition: NB concentration: 100 mg/L, nZVI/BC dosage: 0.30 g/L, initial pH: 8.0

To reveal the removal mechanism of NB by nZVI/BC, the temporal evolution of UV-Vis spectra during reaction were recorded (Fig. S2). In the initial 10 min, characteristic absorption band of NB at 275 nm weakened significantly, ascribed to the fast removal of NB. With the reaction proceed, this band gradually decreased and shifted to longer wavelength, whereas a new absorption peak at 230 nm attributed to aniline increased. This verifies occurrence of NB reduction to aniline. However, other reduction intermediates proposed by previous studies, e.g., nitrosobenzene and phenylhydroxylamine could not be found in this study, probably due to the instability or trace amount.



**Fig. S3** Fe 2p and O 1s X-ray photoelectron spectroscopy of the fresh and used nZVI/BC

The variation of nZVI on biochar during NB removal was investigated by XPS. For fresh nZVI/BC, the presence of small peaks at 706.4 and 719.5 eV (Fig. S3(a)), related to the Fe 2p<sub>3/2</sub> and Fe 2p<sub>1/2</sub> bands of nZVI, indicates the successful preparation of nZVI/BC. After reaction, the characteristic peaks of Fe<sup>0</sup> preserves, while the Fe 2p<sub>3/2</sub> and Fe 2p<sub>1/2</sub> peak of iron oxides appears at 711.0 and 725.8 eV, respectively.

The O 1s displays two peaks at 530.6 and 532.2 eV, which are contributed to the lattice oxygen (O<sub>latt</sub>) and surface adsorbed oxygen (O<sub>ads</sub>), e.g., surface oxygen of hydroxyl species or adsorbed water species, respectively. For fresh nZVI/BC, the O 1s peak is mainly at 532.2 eV. After NB reduction, the O 1s peak shift to 530.6 eV, with intensity obviously increase (Fig. S3(b)). This illustrates the oxidation of nZVI to iron oxides after NB reduction, consistent to the observation by XRD (Fig. 1).